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BOOK REVIEW

Not by Memes Alone

Review of Alan C. Love and William C. Wimsatt (Eds.): *Beyond the Meme: Development and Structure in Cultural Evolution (Minnesota Studies in the Philosophy of Science, 22)*. Minneapolis, MN: The University of Minnesota Press, 2019 (Paperback edition, pp. 542)

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After about 40 years of evolutionary modelling of cultural dynamics, many researchers feel that we still do not have something like a full-fledged *theory* of cultural evolution. This concern is, of course, legitimate; but just a few authors have attempted to provide a diagnosis of why this is so. What kind of phenomena should an evolutionary theory of culture explain? What kind of explanation should this theory offer? What kind of formal tools are the most appropriate to represent cultural processes? Should an evolutionary theory of culture employ formal tools at all? These are all questions that have been answered in many, frequently contrasting, ways.

The reasons why a full-fledged theory of cultural evolution has not been attained yet are not, however, to be exclusively imputed to the disagreements between practitioners. As Love and Wimsatt mention in the introduction of *Beyond the Meme*, culture is indeed a "beast", apparently untameable from a conceptual and theoretical point of view. The variety of facets usually associated with the term "culture" (e.g., behaviours, artefacts, social environment, institutions etc.) makes it difficult to even represent what is at stake in an evolutionary theory of culture—let alone to explain it. Nonetheless, according to the editors of the book, this should be no reason to despair. As a matter of fact, *Beyond the Meme* can be considered as a remedy against the scepticism surrounding the possibility of an evolutionary theory of culture. We should not delude ourselves though: the road to a conceptually satisfactory and empirically accurate theory of cultural dynamics is still long.

In order to properly target our theoretical efforts, we should first of all clear the field of some obstacles. The main critical target of *Beyond the Meme* is, as the name

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of the book suggests, a notion of culture as a highly atomisable phenomenon. This perspective, more commonly associated with memetics (Dawkins 1976), is to a certain extent shared by one of the most successful research programmes in cultural evolution, that is, *dual-inheritance* theory (Boyd and Richerson 1985). Although this approach is not disregarded by the editors of the book (on the contrary, in some cases, it is implicitly endorsed; cf., for instance, Chap. 7 by Marshall Abrams), most contributors agree on the need of complementing it with a somehow more "holistic" view of cultural processes. The overarching framework suitable to integrate existing cultural evolutionary models into a more realistic picture of cultural change and accumulation is mainly provided by Wimsatt in the first chapter of the book.

Wimsatt (relying on some of his previous works; see, especially, Wimsatt and Griesemer 2007) focuses on the structural aspects of cultural phenomena rather than on the dynamical ones, as many practitioners in cultural evolutionary theory usually do. As a matter of fact, it is just by making explicit all the factors making possible the origin and maintenance of cultural phenomena that we can hope to depict them without excessive idealisations (which, although frequently helpful, may easily result in an oversimplification of the object under study). Structural factors *entrench* cultural dynamics, in the sense that they control what sort of evolutionary pathways are, in a certain moment, effectively available and what are not (one may think about structural factors as the factors underpinning and shaping a complex adaptive landscape for cultural phenomena).

Wimsatt distinguishes between two main kinds of structures entrenching the emergence and evolution of specific cultural phenomena, that is, "internal" and "external" structures. The internal structures are chiefly related to the development of the cognitive skills needed to learn complex behaviours and technologies such as the ones typical of human societies. The external structures, on the other hand, identify demographic or institutional factors influencing the diffusion of cultural skills and technologies at a population level. The two different kinds of structures are deeply interconnected, and it is difficult, when the explanation of a cultural phenomenon is at stake, to clearly discern to what extent each one is contributing to the overall process.

The strategy Wimsatt suggests in order to attempt to disentangle such a complex picture is to identify the way in which different factors *scaffold* the cultural process. The notions of scaffold and scaffolding are, indeed, central to virtually all the contributions contained in the book (see, in particular, Chap. 4, by Michael Janssen, and Chap. 8, by Gilbert Tostevin). Although the use of this concept is not always uniform among the authors, in very general terms we may characterise a scaffold as a condition—or, better, a set of conditions—that have to be present to allow certain processes to be properly instantiated. The notion of scaffolding applied to cultural evolution emphasises that cultural processes are typically the result of many mutually dependent and multi-layered conditions (this is especially evident in the case of the evolution of language; see chaper 9, by Salikoko Mufwene, and Chap. 10, by Massimo Maiocchi).

In accordance with the distinction between internal and external structures, it is possible to distinguish between factors scaffolding (both biologically and socially) individual learning skills and factors scaffolding the institutions promoting (or

undermining) the diffusion of such skills and of the technologies resulting from the diffusion of such skills.

At the level of the individuals, we are confronted with a variety of developmental constraints that may severely bias the way in which cultural information is assimilated and transmitted. Tostevin (Chap. 8), an experienced archaeologist, provides a nice illustration of the importance of taking into account such constraints. Traditional evolutionary models of flintknapping techniques during the Palaeolithic tend to infer knowledge about the technological skills of the crafters exclusively from the finished artefacts. Nonetheless, the learning of flintknapping techniques involves an array of different (cognitive, manual, social) complex skills, which cannot be fully appreciated if we do not consider more carefully also the way in which the crafters are encultured.

The emphasis on the individual developmental scaffolding is intended, among other things, to provide a more solid framework for the study of the diffusion dynamics of cultural traits. In this respect, Wimsatt introduces the notion of *transmissible or replicable elements* (TREs) in order to characterise cultural transmissible items (artefacts, practices, ideas etc.). TREs are supposedly different from memes insofar as they are not autonomous, self-replicating entities, but rather part of complex arrays of elements conditioning, in their turn, individual learning strategies. The deep interconnectedness between developmental constraints and TREs diffusion is, in Wimsatt's view, an aspect differentiating the overall outlook defended by many contributions in the book and the one advocated by dual inheritance theory, which would support a much stronger analogy between cultural transmission and genetic inheritance.

In this sense, the conceptual framework here proposed certainly contributes to the formulation of more sophisticated models of cultural transmission, as attested by Foster and Evans' chapter (Chap. 5). The two sociologists observe that horizontal transmission (that is, from peer to peer) of cultural information is ubiquitous in modern societies. This difference with respect to genetic inheritance, which is typically vertical (that is, from parents to offspring), albeit not unnoticed, has not received the sufficient attention. In particular, it is not properly accounted for by traditional phylogenetic approaches. In order to rectify this situation, Foster and Evans elaborate a *reticulate* model of cultural transmission and test the effects of multiple "parents" on the emergence of cultural novelties (the role of multiple "parents" on the emergence of scientific novelty is also one of the topics of Chap. 4, by historian of science Michel Janssen).

While I find the attempt to better integrate developmental factors into the dynamical models of cultural evolution certainly admirable, I am not sure that this is something that cannot be done within more traditional approaches to cultural evolution, like dual-inheritance theory. If the difference between TREs and Boyd and Richerson's cultural variants is that the distinctive conceptualisation of TREs makes them more dependent on specific developmental processes involved in their transmission, then the difference is just of degree. As a matter of fact, during the last decades, also dual-inheritance theorists have increasingly attempted to integrate developmental factors with evolutionary ones. As testified by recent works (see, for instance, Kendal et al. 2018), one of the main points of cultural evolutionists' agenda is to refine

our understanding of the cognitive biases involved in the transmission of cultural variants, so as to provide a more realistic picture of the diffusion of specific cultural skills or technologies (see also Heyes 2018).

An aspect that, on the contrary, has received far less attention by cultural evolutionists is the scaffolding provided by external structures. Although, as a matter of fact, models accounting for population-level constraints on cultural evolution have been proposed—such as those formulated within niche construction theory (Odling-Smee et al. 2003) and cultural group selection (Wilson 2019)—, these do not fully explore the implications that institutions have on individual development. A full understanding of these implications involves a distancing from a purely biological/evolutionary point of view, to incorporate results from those areas that traditionally have studied the relation between institutions and their material realisations and effects, that is, the social sciences. In this sense, the proposal supported by the authors of *Beyond the Meme* positively contributes to the realisation of a goal frequently magnified, but rarely attained: the construction of a productive and equilibrate debate between cultural evolutionists and social scientists.

This interplay between disciplines is nicely illustrated in a variety of ways by many chapters of the book. For instance, Sabina Leonelli (Chap. 2) and Nancy Nersessian (Chap. 3) investigate two ways in which scientific practices are made possible by, respectively, the constitution of social organisations and laboratories. Joseph Martin (Chap. 11) shows how institutionalised technologies may scaffold specific skills through the introduction of public policies. Paul Smaldino (Chap. 12) assesses some attempts of accounting for the phenomenon of *social identity* (especially from the perspective of cultural group selection theory) and proposes to complement them through a study of the organisational networks that arise in modern societies.

Many contributions in the book are exploratory in their nature, in the sense that they aim to emphasise the complexity of the phenomena of scaffolding in cultural evolution rather than put forward well-defined models to encompass such a complexity. Two notable exceptions, in this sense, are the works of Mark Bedau (Chap. 6) and Andersson, Törnberg and Törnberg (Chap. 13). Both chapters are focused on methodological questions, although these are approached in distinct ways. Bedau calls attention on the fact that in cultural evolutionary theory, just as in evolutionary biology, it would be extremely fruitful to work with analogues of "model organisms". Bedau argues that patents are good candidates as "model cultural systems". As a matter of fact, they are an example of a cultural phenomenon of which we have a complete record, well-organised and full of standardised information about the inventors and the characteristics of the innovations. From this information, Bedau infers some interesting hypotheses about the phylogeny and dynamics of patents.

Andersson and his collaborators close the book with some more general considerations about the proper conceptualisation of cultural processes. On their view, social systems cannot be just conceived as complex systems (in which new dynamics emerge from the aggregative interactions between the components of the system) or as "complicated" systems (in which dynamical processes are the result of the interplay between the distinct levels that make up the system). They rather constitute a different kind of systems—which are both complex and complicated but, at

the same time, not fully reducible to these interpretative categories—that the authors call *wicked* systems. In wicked systems, the difficulty to make predictions is due to the entanglement between levels and to the effects of the environment that continuously produces changes in the structures under study, making them poorly decomposable. New conceptual approaches and formal tools must be ideated in order to properly deal with this characteristic kind of systems.

Overall, *Not by Memes alone* is a challenging but extremely rewarding reading. It is challenging because culture—as Love and Wimsatt say—is a "beast" that can be attacked from a variety of standpoints. To fully understand the individual strategies deployed by the authors of the book requires not just some preliminary knowledge of Wimsatt's interpretative framework, but also competences in the many specific scientific fields called to participate in this collective effort. Once the reader, nonetheless, accepts the difficulty of the task at hand and acknowledges that the topic of cultural evolution must by approached, above all, with intellectual humility, she will discover in the pages of this book a rich collection of case studies, original ideas and thought-provoking questions.

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